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Electronic Supplementary Information

Conjugated Porous Polymers: Incredibly Versatile Materials with Far-reaching Applications

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Table S1 Structures of CPPs utilised for CO_2 capture. Corresponding data can be found in Table 1.

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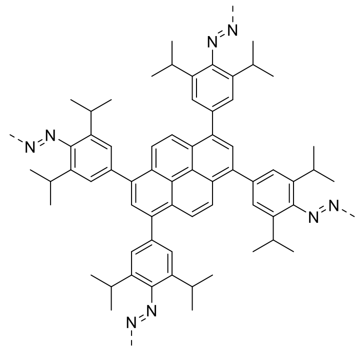
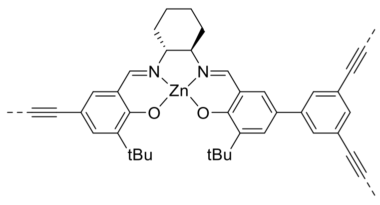
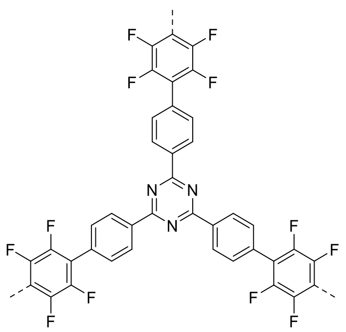
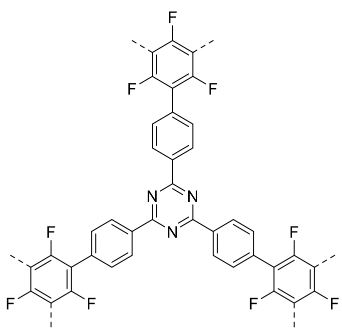
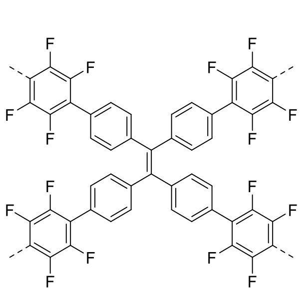
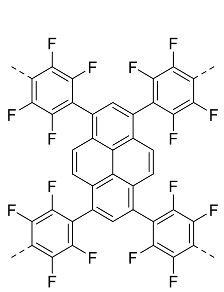
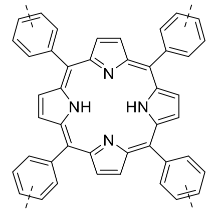
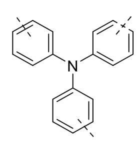
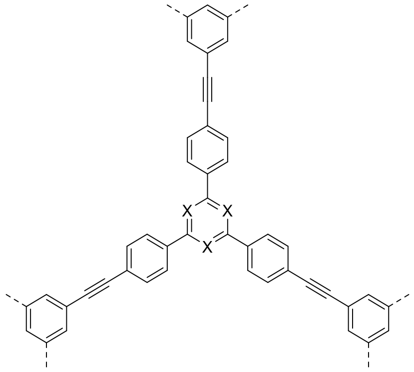
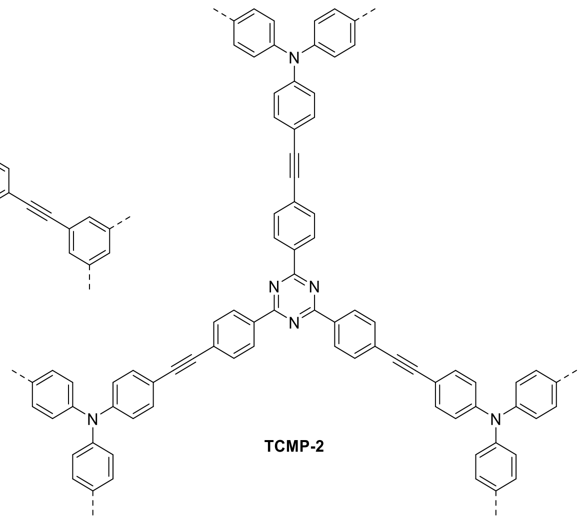
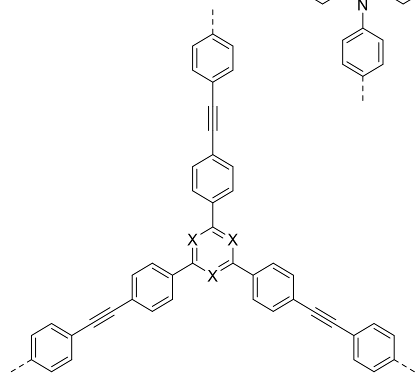
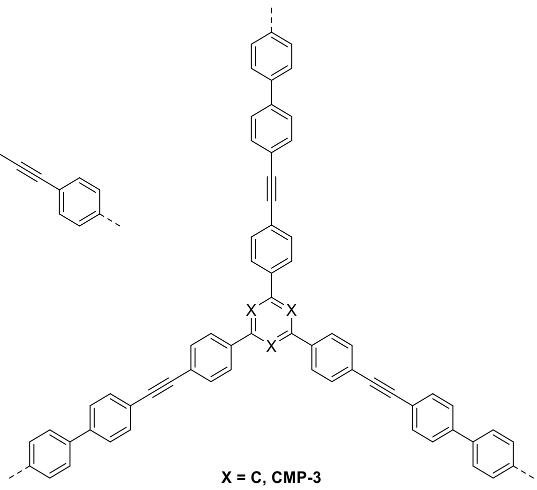
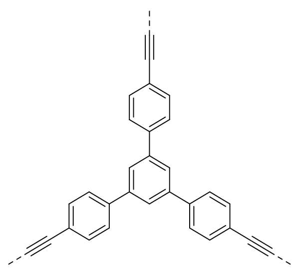
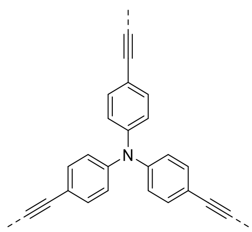
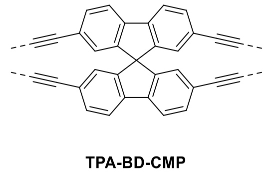
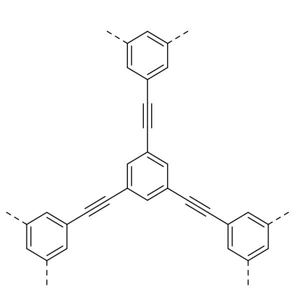
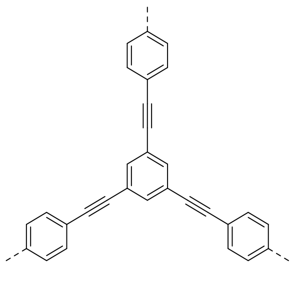
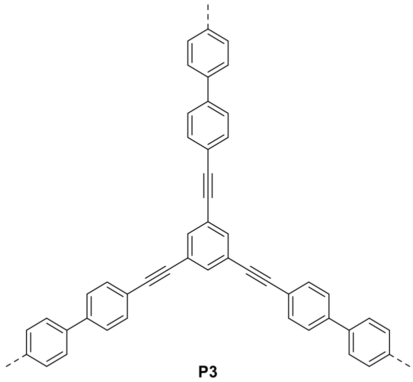
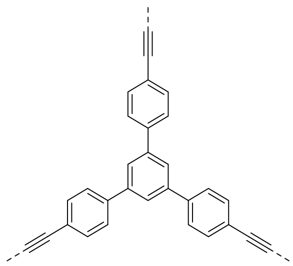
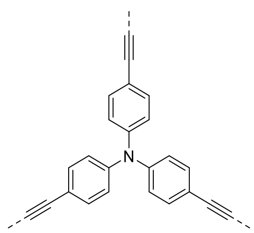
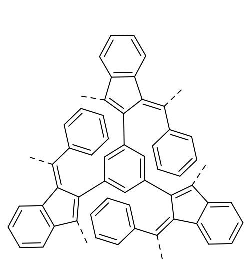
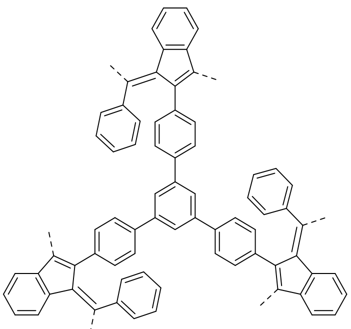
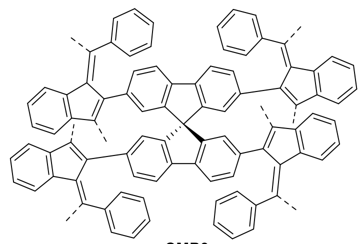
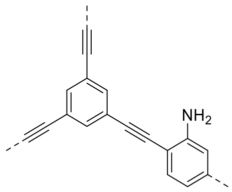
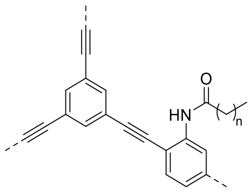
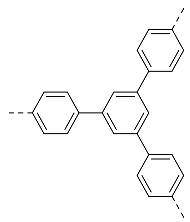
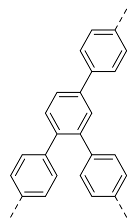
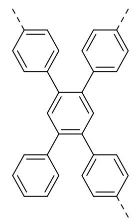
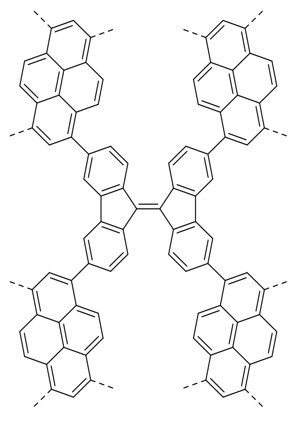
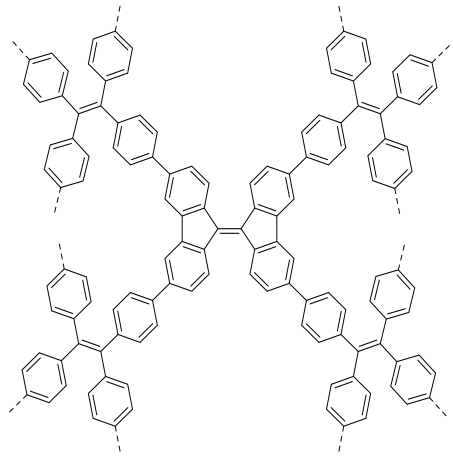
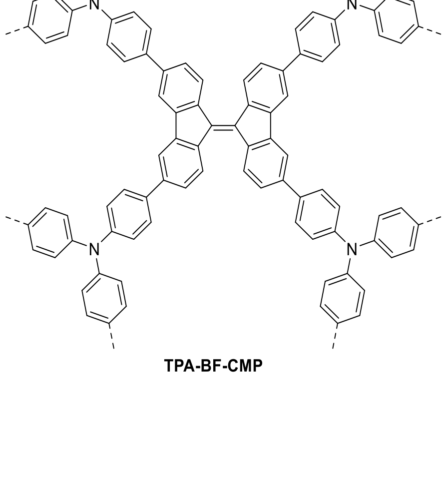
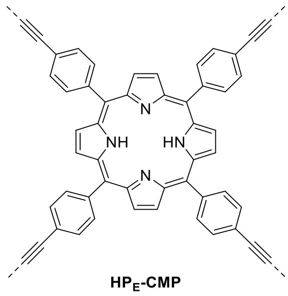
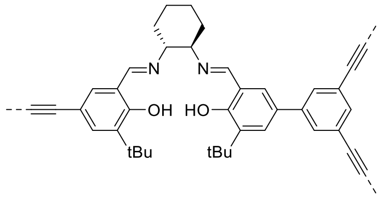
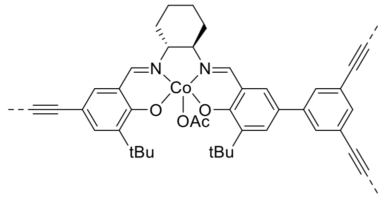
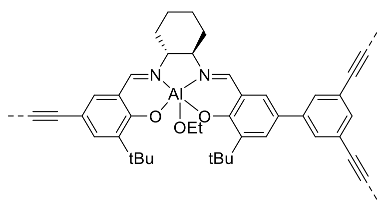
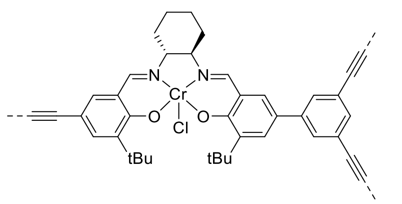
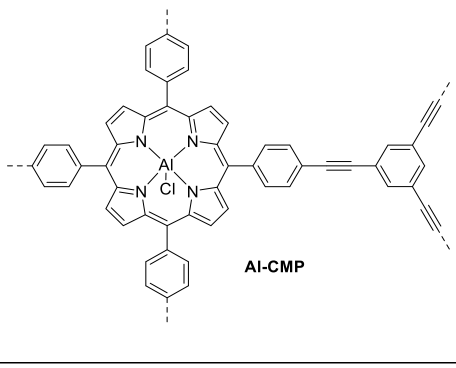
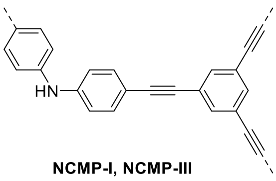
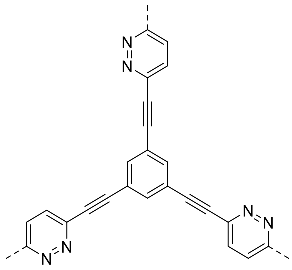
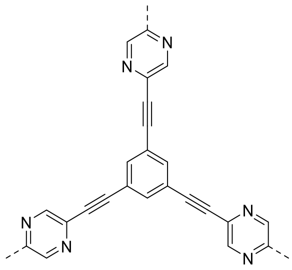
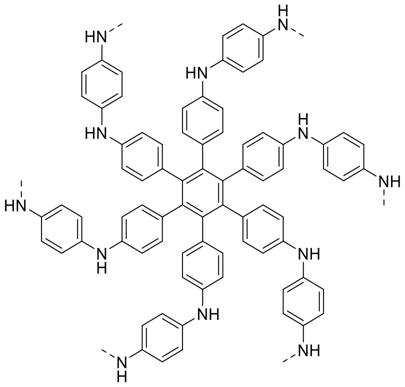
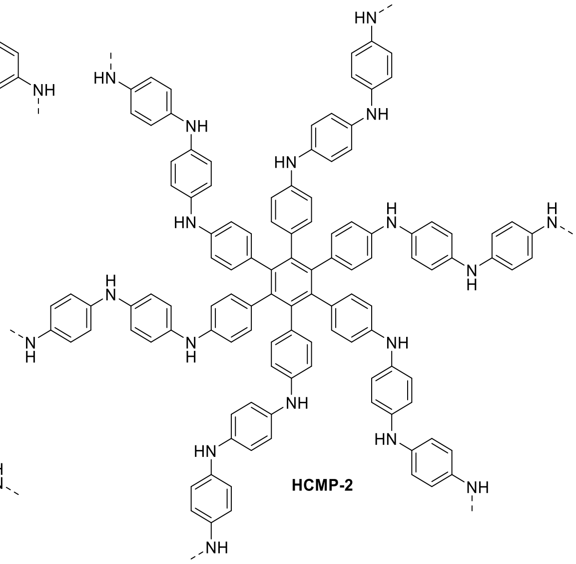
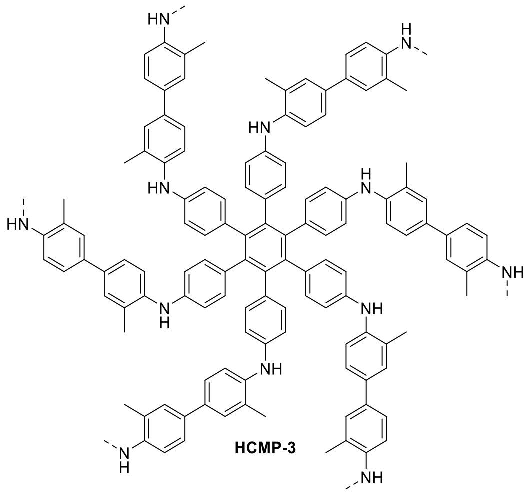
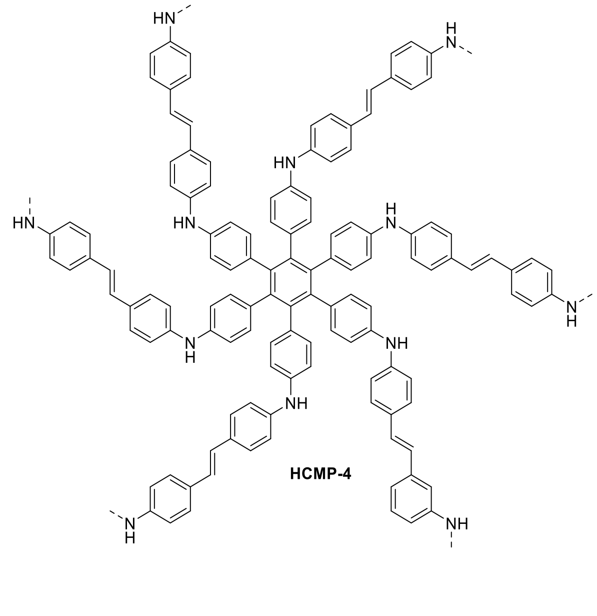
1	 **Py-azo-COP**	S1
2	 **Zn-CMP**	S2
3	 **CMP 1**  **CMP 2**	S3
4	 **NWPTPE**  **NWPPYR**	S4
5	 **HCTPP**  **HCTPA**	S5

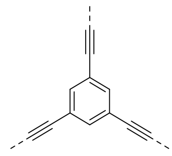
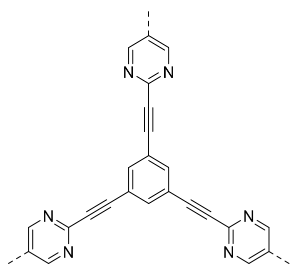
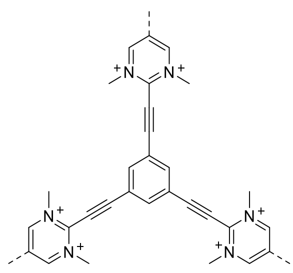
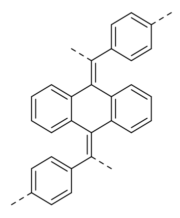
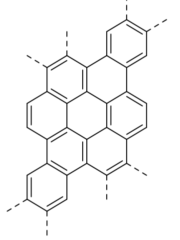
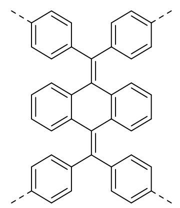
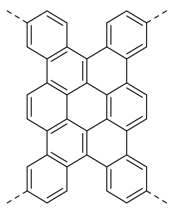
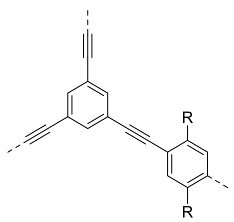
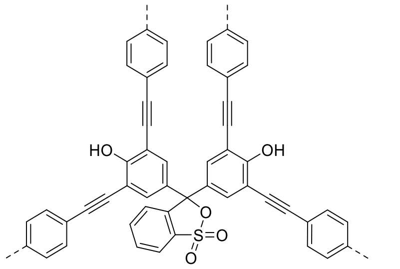
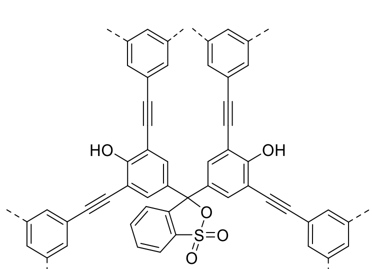
6	 **X = C, CMP-0** **X = N, TCMP-0**  **TCMP-2**  **X = C, CMP-3** **X = N, TCMP-3**  **X = C, CMP-3** **X = N, TCMP-3**	S6
7	 **TPB-BD-CMP**  **TPA-BD-CMP**  **TPA-BD-CMP**	S7

8	 **P1**  **P2**  **P3**	S8
9	 **ACMP-C6**  **ACMP-N**	S9
10	 **CMP1**  **CMP2**  **CMP3**	S10

11	 **CMP-1-NH$_2$**  **n = 0, CMP-1-AMD1** **n = 1, CMP-1-AMD2** **n = 2, CMP-1-AMD3** **n = 3, CMP-1-AMD4** **n = 4, CMP-1-AMD5**	S11
12	 **PP-CMP@mmm**  **PP-CMP@omp**  **PP-CMP@omom**	S12
13	 **Py-BF-CMP**  **TPE-BF-CMP**  **TPA-BF-CMP**	S13

14	 **HP$_E$-CMP**	S14
15	 **CMP**  **Co-CMP**  **Al-CMP**	S15
16	 **Cr-CMP**	S16
17	 **Al-CMP**	S17
18	 **NCMP-I, NCMP-III**	S18

19	 BQCMP-1  DQCMP-1	S19
20	 HCMP-1  HCMP-2  HCMP-3  HCMP-4	S20

21	 **PTEB-1**	S21
22	 **CMP-PM**  **CMP-PM-Me**	S22
23	 **BO-CMP-1**  **oBO-CMP-1**  **BO-CMP-2**  **oBO-CMP-2**	S23
24	 **R = R' =H, CMP-1** **R = R' = OH, CMP-1-$(CH_3)_2$** **R = R' = CH_3, CMP-1-$(OH)_2$**	S24
25	 **BFCMP-1**  **BFCMP-2**	S25

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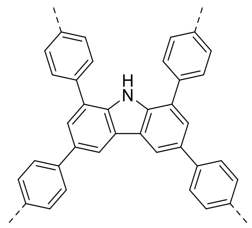

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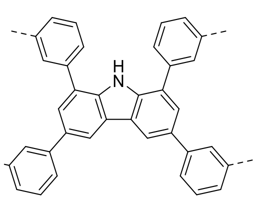

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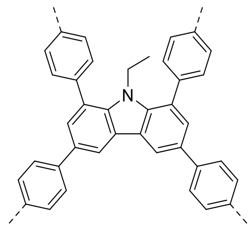

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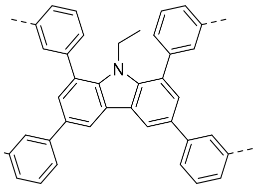

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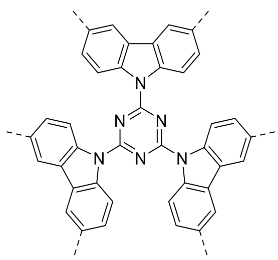

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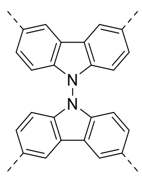

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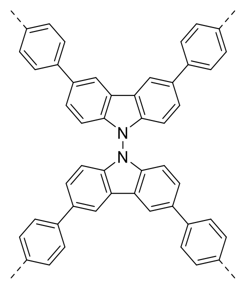

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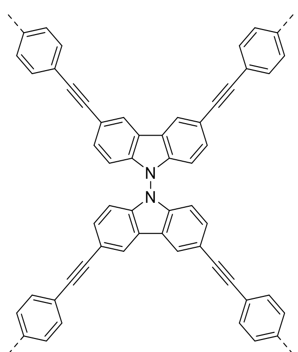

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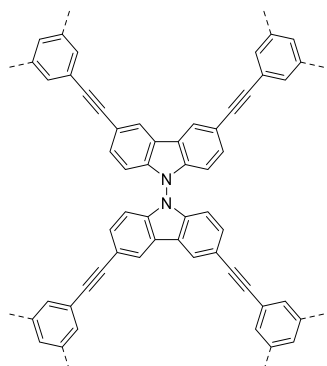

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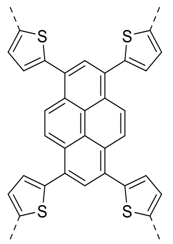
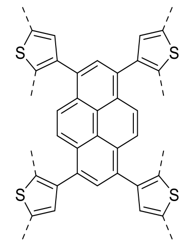
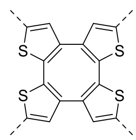
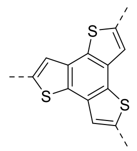
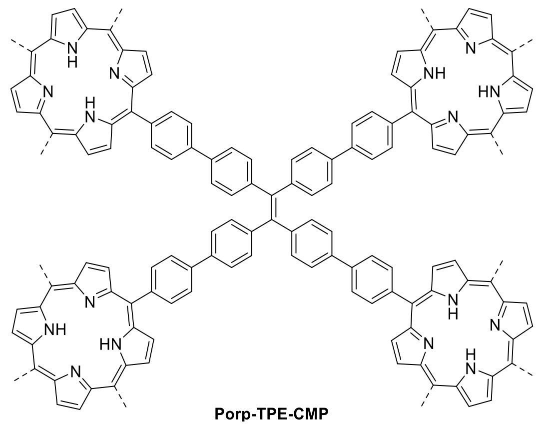
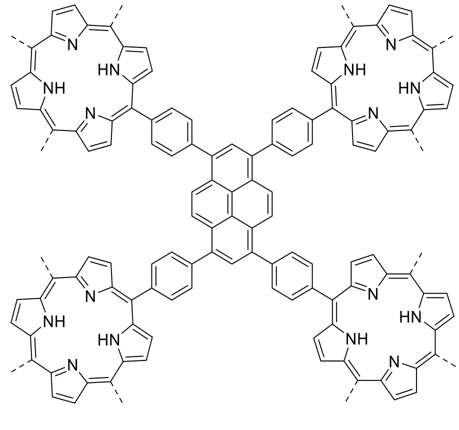
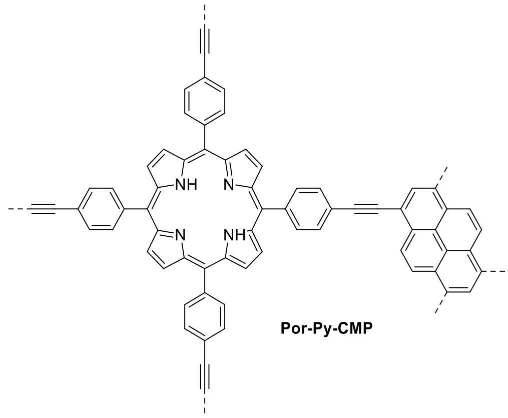
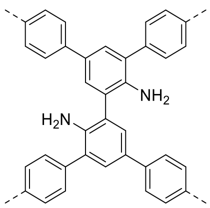
29	 CK-COP-1  CK-COP-2	S29
30	 ThPOP-1  ThPOP-2	S30
31	 Porp-TPE-CMP  Porp-Py-CMP	S31

32	S32

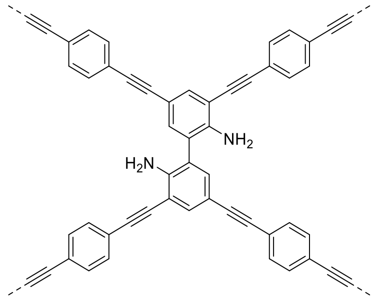


Por-Py-CMP

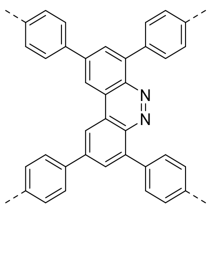
33	S33



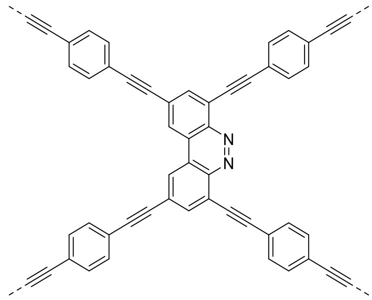
DA-CMP1



DA-CMP2

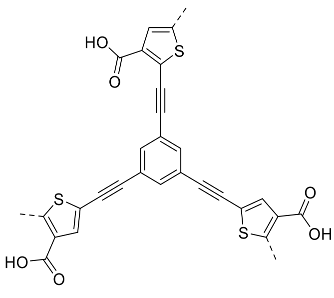


Azo-CMP1

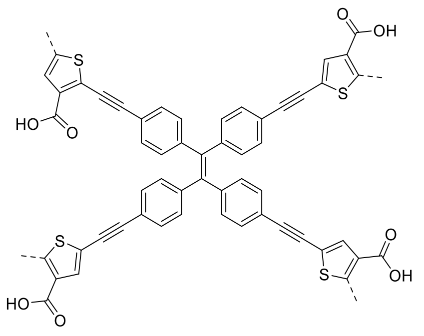


Azo-CMP2

34	S34

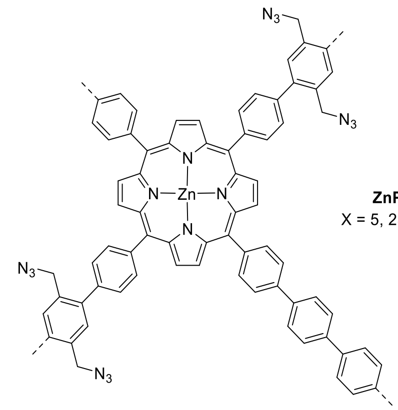


SCMP-COOH@1

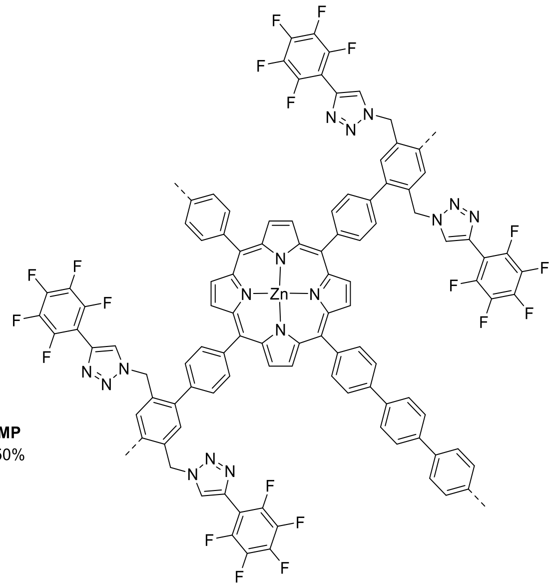


SCMP-COOH@2

35 | S35

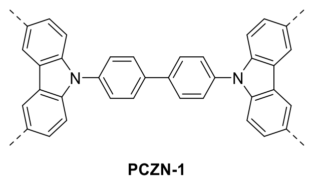


ZnP-XN_3-CMP
X = 5, 25, 50, 75, 100%

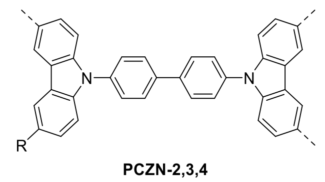


ZnP-XF-CMP
X = 5, 25, 50%

36 | S36

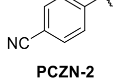


PCZN-1

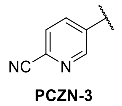


PCZN-2,3,4

R =

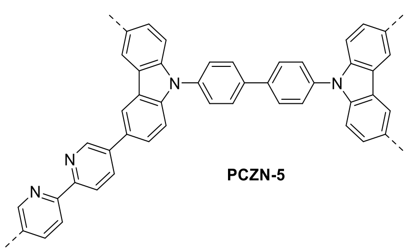


PCZN-2

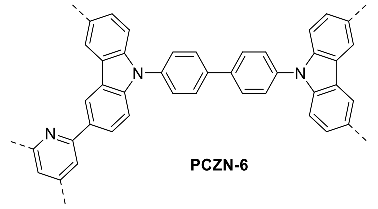


PCZN-3

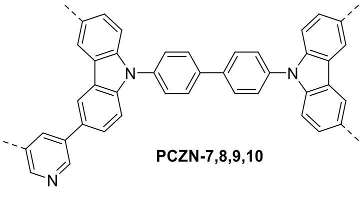
PCZN-4



PCZN-5

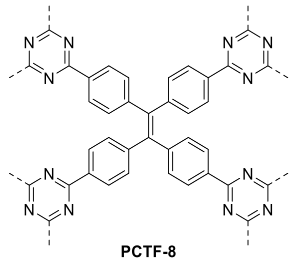


PCZN-6



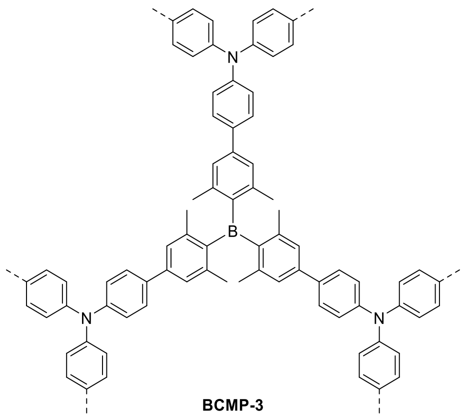
PCZN-7,8,9,10

37 S37



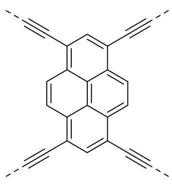
PCTF-8

38 S38



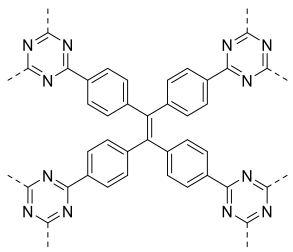
BCMP-3

39 S39



LKK-CMP-1

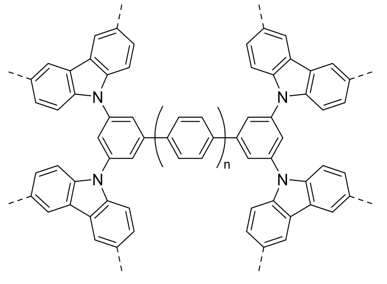
40 S40



Molar ratio of monomer:
$ZnCl_2$ catalyst

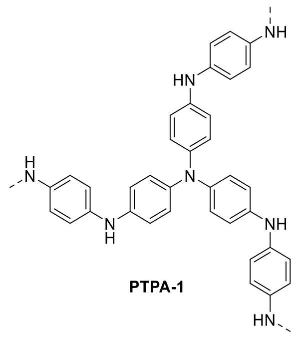
1 : 10 **PCTF-1**
1 : 5 **PCTF-2**

41 S41

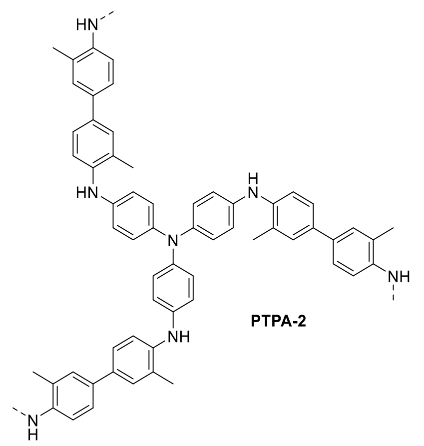


n = 0, **CPOP-8**
n = 1, **CPOP-9**
n = 2, **CPOP-10**

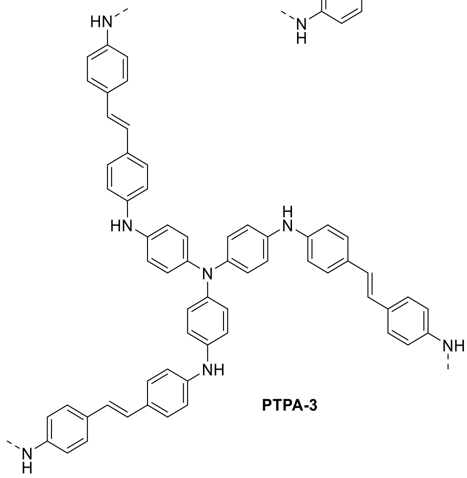
42 | S42



PTPA-1

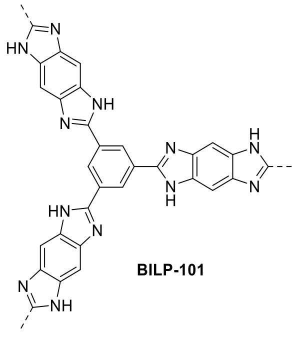


PTPA-2



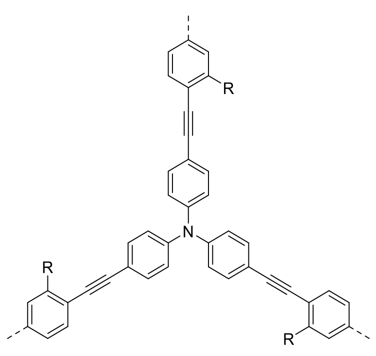
PTPA-3

43 | S43

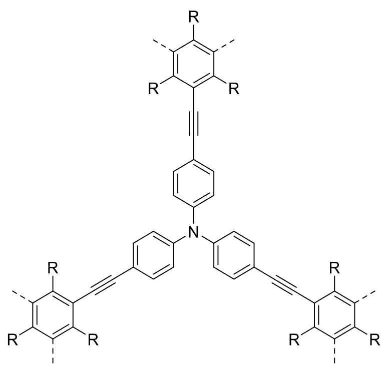


BILP-101

44 | S44

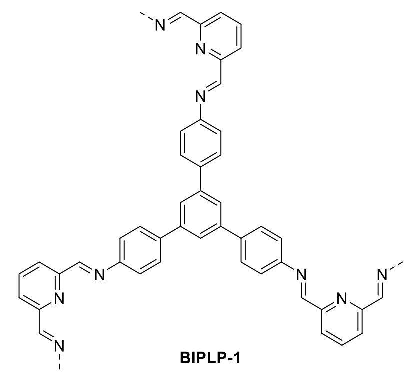


R = H **PAF-33**
R = NH_2 **PAF-33-NH_2**
R = CO_2H **PAF-33-COOH**



R = H **PAF-34**
R = OH **PAF-34-OH**

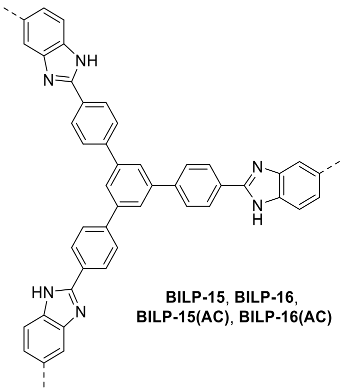
45 S45



BIPLP-1

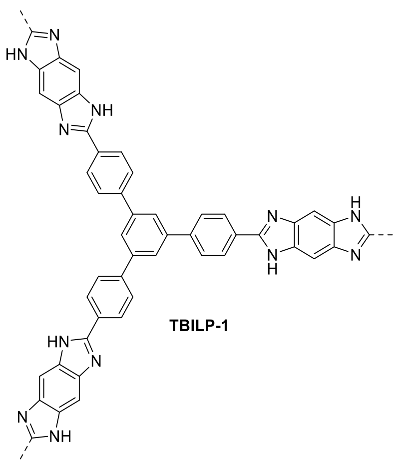
BIPLP-1 is reacted with Cu(BF$_4$) to give **Cu/BF$_4$/BIPLP-1**

46 S46



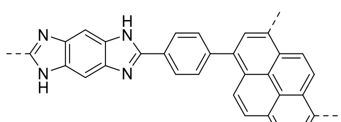
BILP-15, **BILP-16**, **BILP-15(AC)**, **BILP-16(AC)**

47 S47

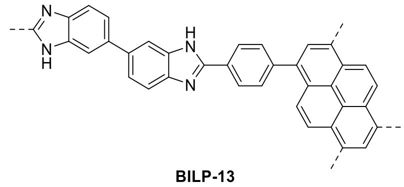


TBILP-1

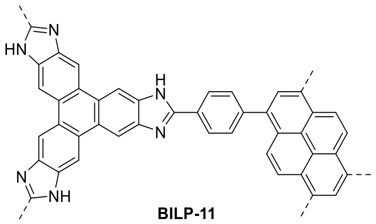
48 S48



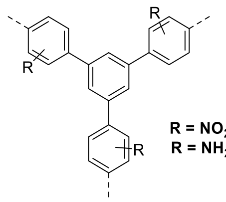
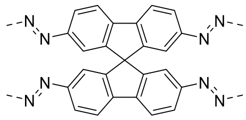
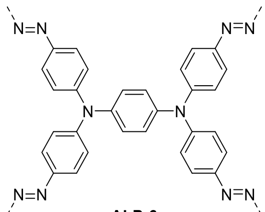
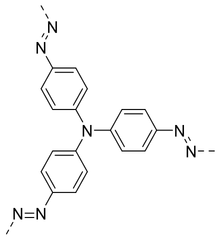
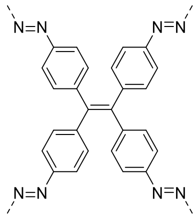
BILP-10



BILP-13

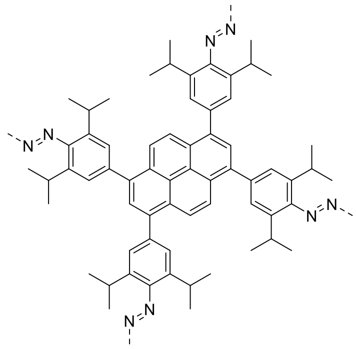
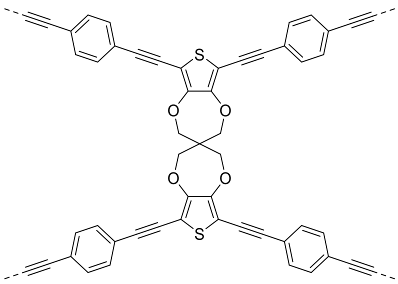
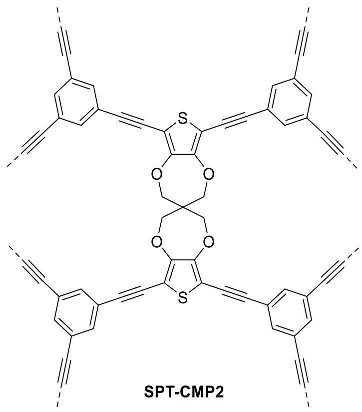
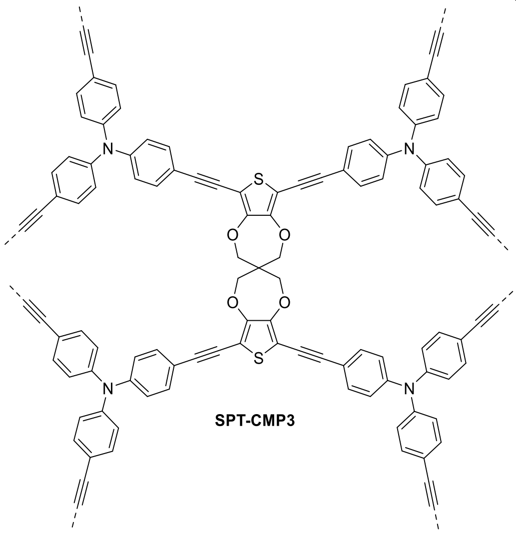


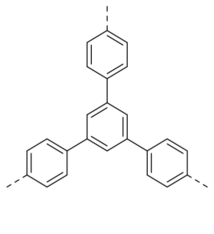
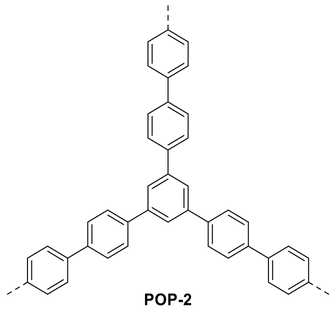
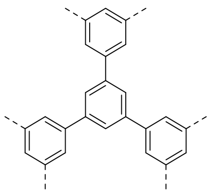
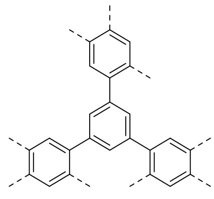
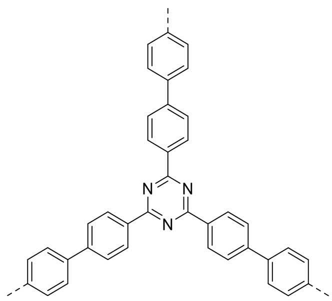
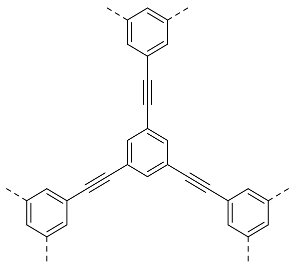
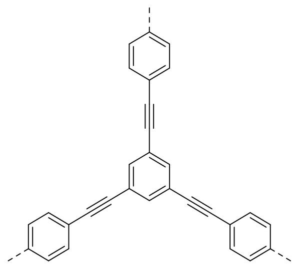
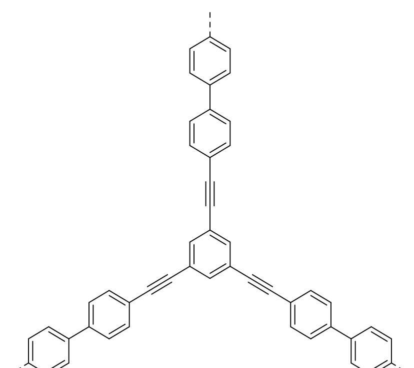
BILP-11

49	 **R = H, NPOF-1** **R = NO_2, NPOF-1-NO_2, NPOF-1-NO_2 (xs)** **R = NH_2, NPOF-1-NH_2, NPOF-1-NH_2 (xs)**	S49
50	 **ALP-5**  **ALP-6**  **ALP-7**  **ALP-8**	S50

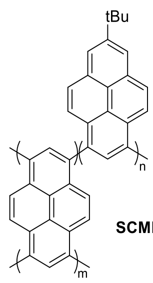
2. Structures of CPPs Corresponding to Data in Table 2

Table S2 Structures of CPPs utilised for H_2 capture. Corresponding data can be found in Table 2.

Entry	Material Name and Structure	Reference
1	 **Py-azo-COP**	S1
2	 **SPT-CMP1**  **SPT-CMP2**  **SPT-CMP3**	S51

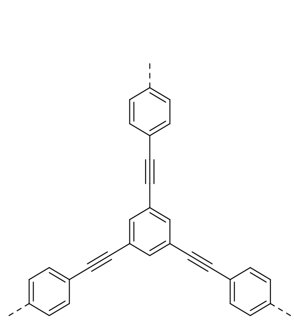
3	 **POP-1**  **POP-2**  **POP-3**  **POP-4**	S52
4	 **DCBP**	S53
5	 **P1**  **P2**  **P3**	S8

6 S[54]

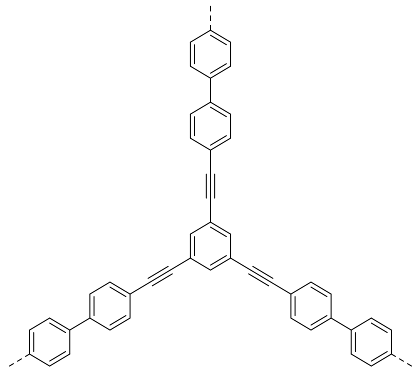


SCMP1

7 S55



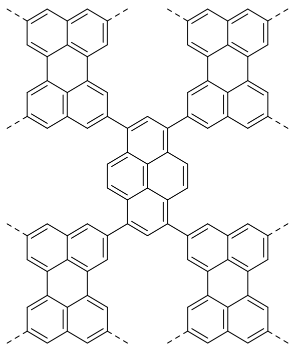
CPN-1



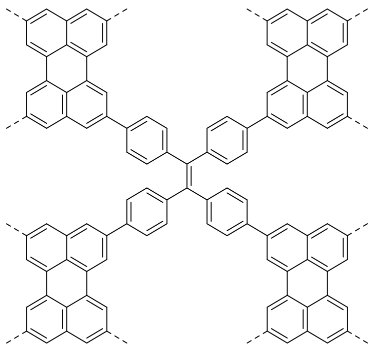
CPN-6

Ratio of phenylene: biphenylene linker	
100 : 0	**CPN-1**
80 : 20	**CPN-2**
60 : 40	**CPN-3**
40 : 60	**CPN-4**
20 : 80	**CPN-5**
0 : 100	**CPN-6**

8 S56

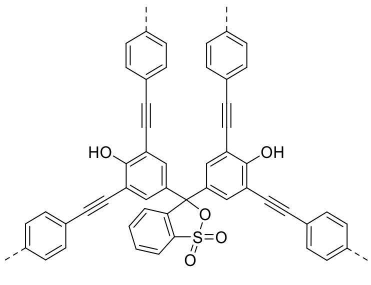


PrPy

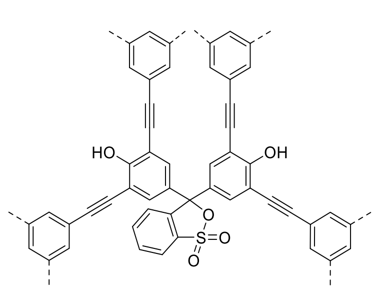


PrTPE

9 S25

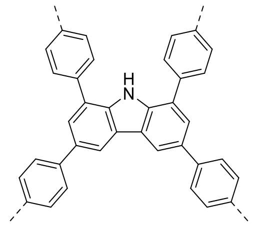


BFCMP-1

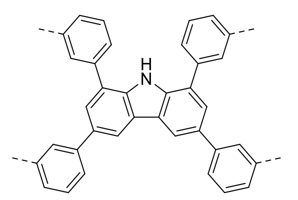


BFCMP-2

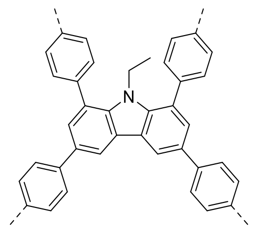
10 S26



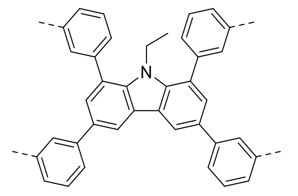
PPTBC



PMTBC

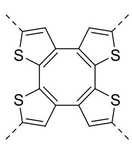


PPETBC

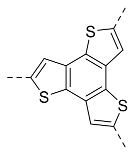


PMETBC

11 S30

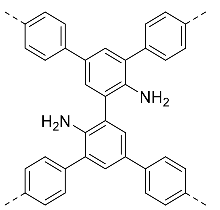


ThPOP-1

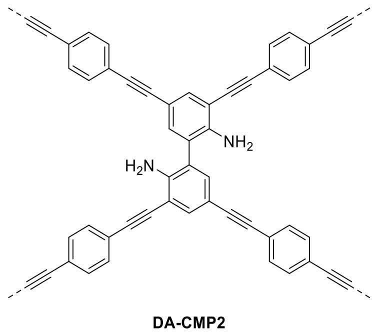


ThPOP-2

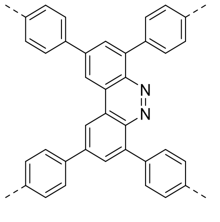
12 S33



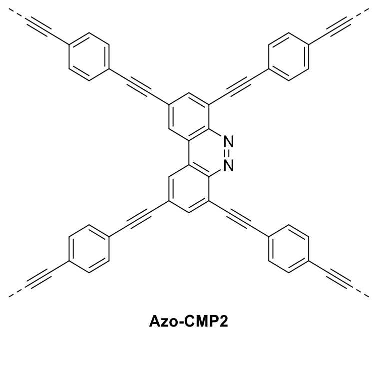
DA-CMP1



DA-CMP2

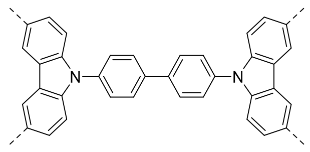


Azo-CMP1

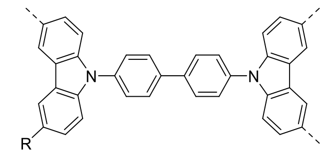


Azo-CMP2

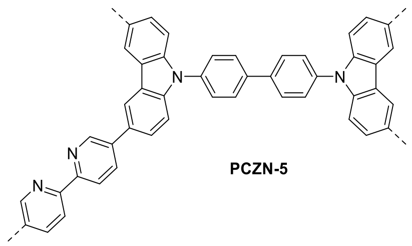
13 S36



PCZN-1

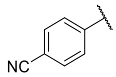


PCZN-2,3,4

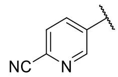


PCZN-5

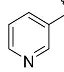
R =



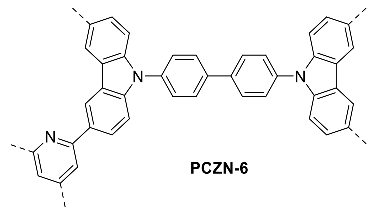
PCZN-2



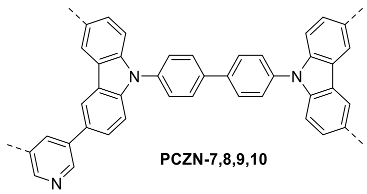
PCZN-3



PCZN-4

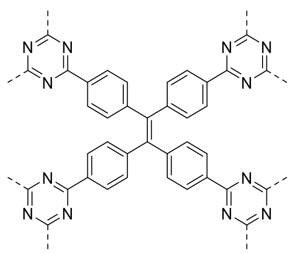


PCZN-6



PCZN-7,8,9,10

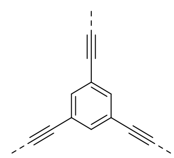
14 S40



Molar ratio of monomer:
$ZnCl_2$ catalyst

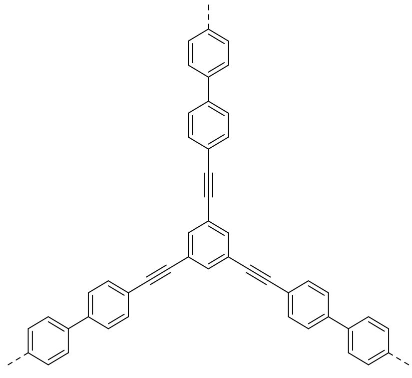
1 : 10 **PCTF-1**
1 : 5 **PCTF-2**

15 S57

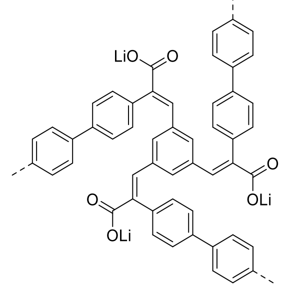


HCMP-1

16 S58

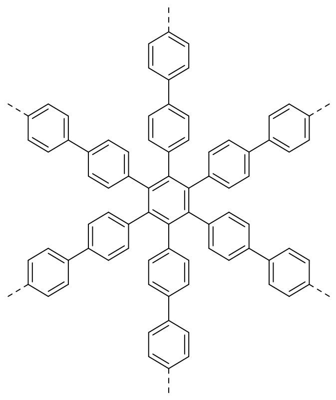


COP-1

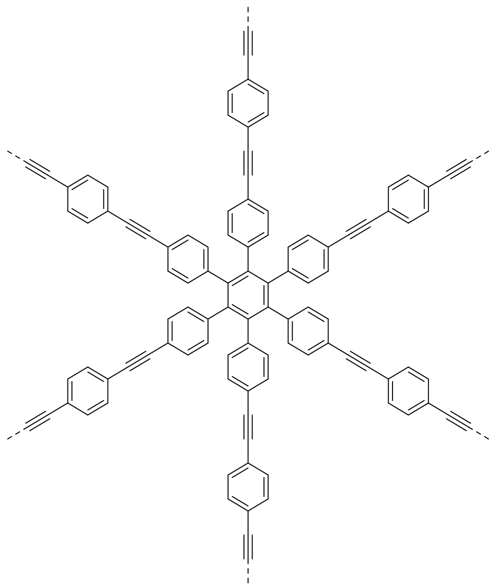


Li@COP-1

17 S59

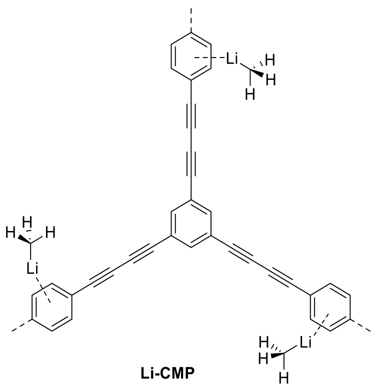


HPOP-1



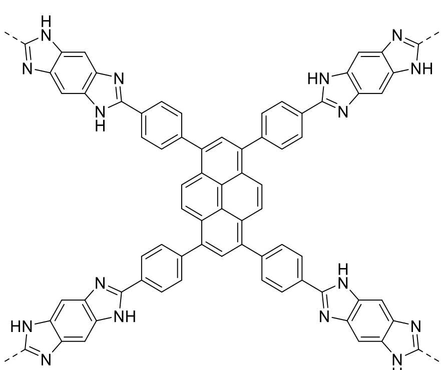
HPOP-2

18 S60

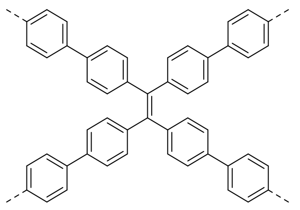
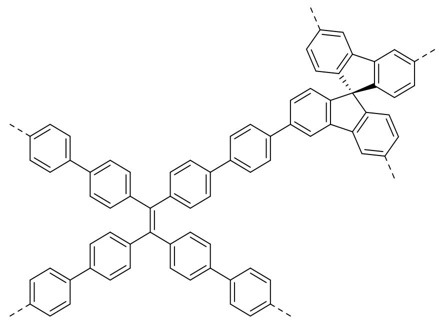
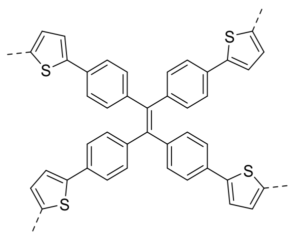
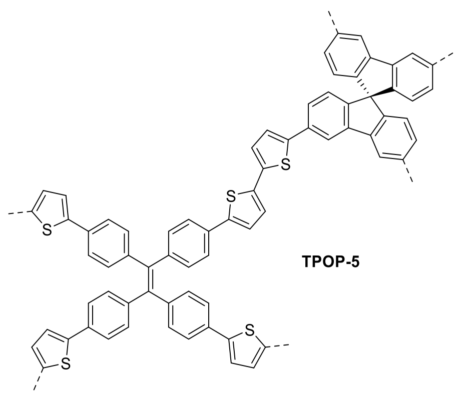


Li-CMP

19 S61

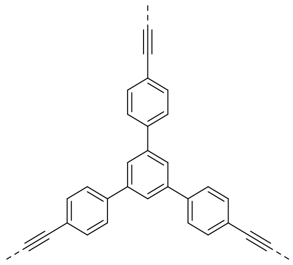
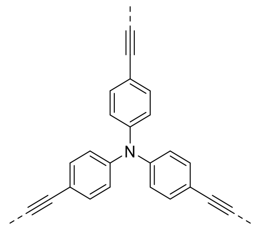
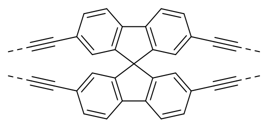
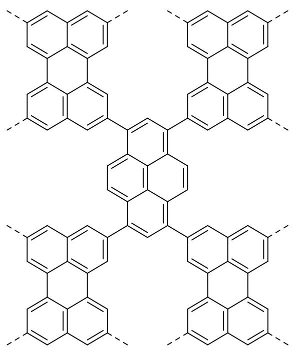
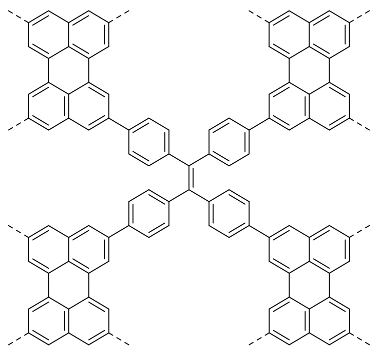
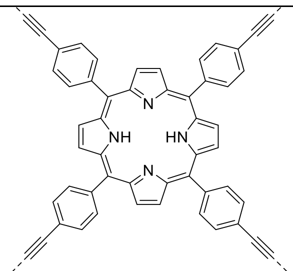
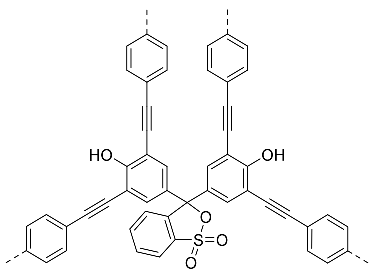
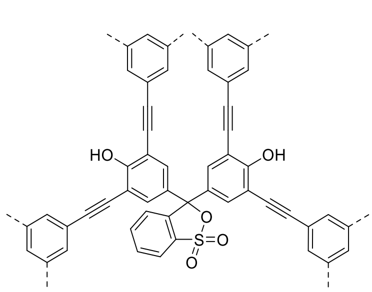


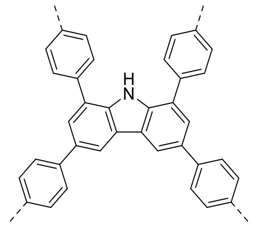
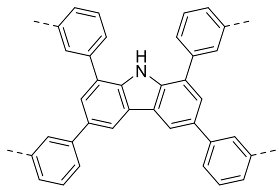
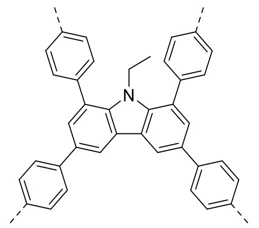
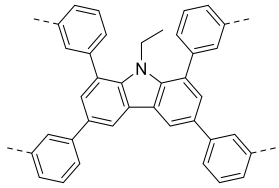
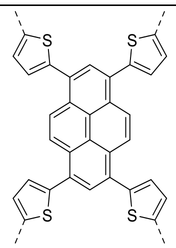
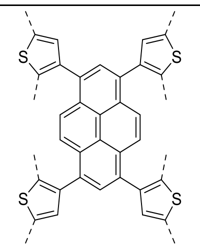
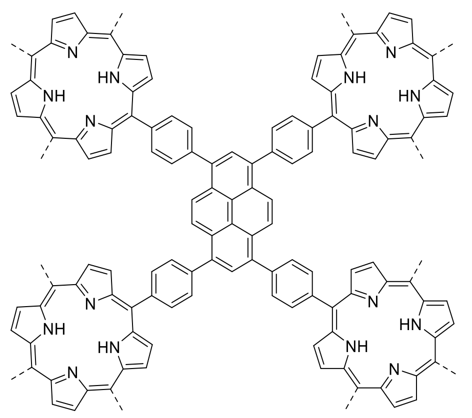
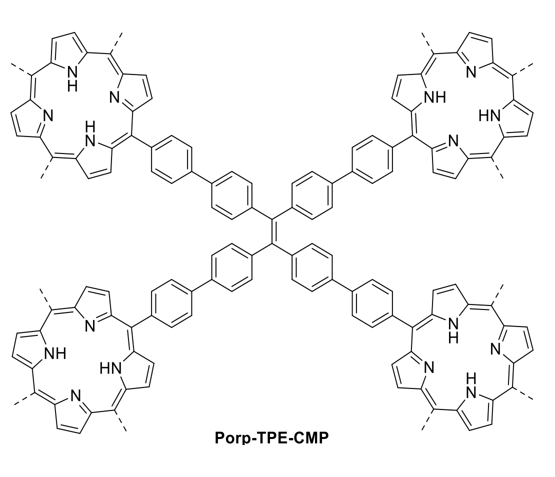
BILP-10

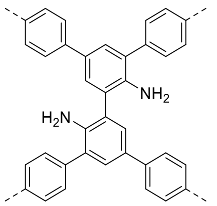
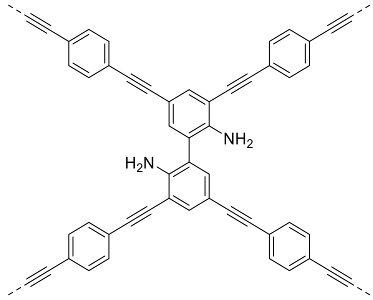
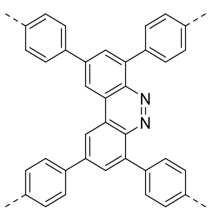
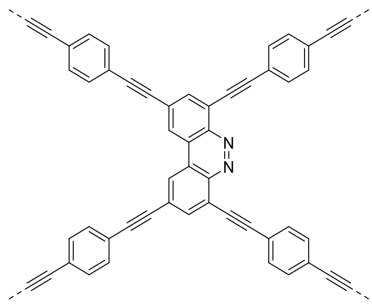
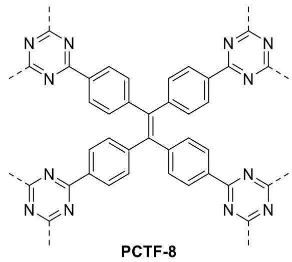
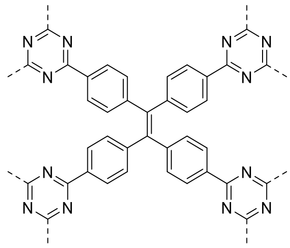
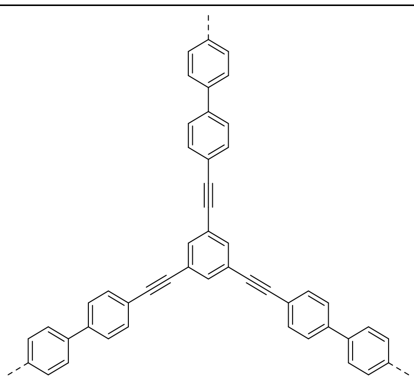
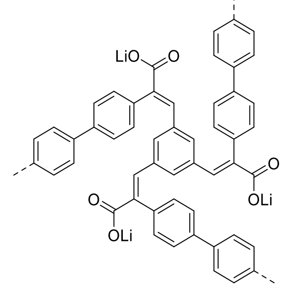
20	 TPOP-1  TPOP-3  TPOP-4  TPOP-5	S62

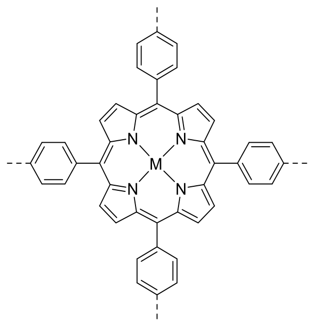
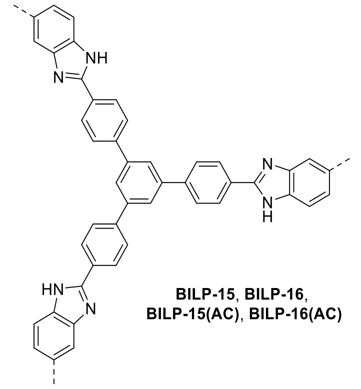
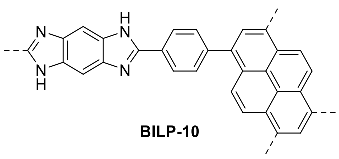
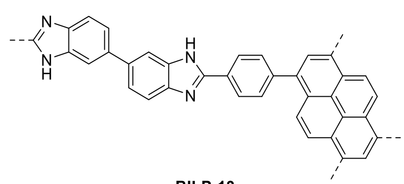
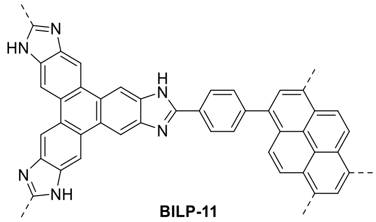
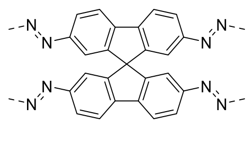
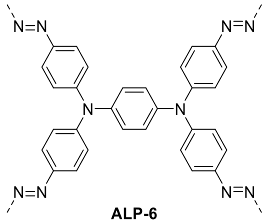
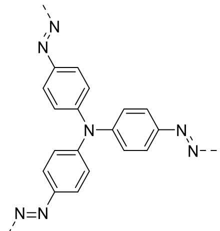
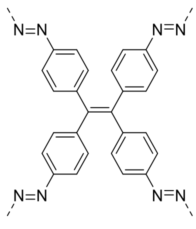
3. Structures of CPPs Corresponding to Data in Table 3

Table S3 Structures of CPPs utilised for CH_4 capture. Corresponding data can be found in Table 3.

Entry	Material Name and Structure	Reference
1	 TPB-BD-CMP  TPA-BD-CMP  TPA-BD-CMP	S7
2	 PrPy  PrTPE	S56
3	 HP_E-CMP	S14
4	 BFCMP-1  BFCMP-2	S25

5	 PPTBC  PMTBC  PPETBC  PMETBC	S26
6	 CK-COP-1  CK-COP-2	S29
7	 Porp-Py-CMP  Porp-TPE-CMP	S31

8	 **DA-CMP1**  **DA-CMP2**  **Azo-CMP1**  **Azo-CMP2**	S33
9	 **PCTF-8**	S37
10	 Molar ratio of monomer: $ZnCl_2$ catalyst 1 : 10 **PCTF-1** 1 : 5 **PCTF-2**	S40
11	 **COP-1**  **Li@COP-1**	S58

12	 M = H **PAF-40** M = Fe **PAF-40-Fe** M = Mn **PAF-40-Mn**	S63
13	 **BILP-15**, **BILP-16**, **BILP-15(AC)**, **BILP-16(AC)**	S46
14	 **BILP-10**  **BILP-13**  **BILP-11**	S48
15	 **ALP-5**  **ALP-6**  **ALP-7**  **ALP-8**	S50

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